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A Standard for the Transmission of IP Datagrams over NetBIOS Networks

Status of this Memo

This document specifies a standard method of encapsulating the Internet Protocol [1] (IP) datagrams on NetBIOS [2] networks. Distribution of this memo is unlimited.

Introduction

The goal of this specification is to allow compatible and interoperable implementations for transmitting IP datagrams over NetBIOS networks.

NetBIOS is a standard which specifies a means of creating virtual circuits and of transmitting and receiving point-to-point, multicast, and broadcast datagrams. This specification uses only the datagram services.

Previous versions of this memo specified the use of the NetBIOS broadcast datagram services instead of the NetBIOS group name services to implement IP broadcasting. These versions are now obsolete.

Description

NetBIOS networks may be used to support IP networks and subnets [3] of any class. By means of encapsulating IP datagrams within NetBIOS datagrams and assigning IP numbers to the hosts on a NetBIOS network, IP-based applications are supported on these hosts. The addition of a router capable of encapsulating IP packets within ordinary data-link protocols (such as 802.3 [4]) as well as within NetBIOS datagrams allows these NetBIOS hosts to communicate with the Internet at large.

Address Mappings

In general, NetBIOS names may be any series of 16 bytes, however, a few values are reserved or used by common networking packages. NetBIOS names for the IP applications on each host are chosen on the basis of the internet number of that host. Since NetBIOS names are a mapping of IP addresses, no physical address query mechanism (e.g., ARP [5]) is required.

For these internet protocol applications, IP.XX.XX.XX.XX is the NetBIOS name for any IP over NetBIOS host where XX represents the ascii hexadecimal representation of that byte of the internet address.

This addressing scheme allows for the multiplexing of standard datagram protocols over NetBIOS as well as easy visual confirmation of the correctness of a given packet's address.

Broadcast and Multicast Addresses

Broadcast Internet addresses are represented by the NetBIOS group name IP.FF.FF.FF.FF. Currently, no attempt is made to provide support of IP multicast addresses using NetBIOS group names.

Maximum Transmission Unit

The maximum data size of a NetBIOS datagram, and therefore the Maximum Transmission Unit (MTU) for IP over NetBIOS networks, is 512 bytes. Therefore, any hosts communicating with a host on a NetBIOS network may be required to reassemble fragmented datagrams.

Implementation

To support IP on a NetBIOS host for any given IP address the initialization code must:

1) Add IP.XX.XX.XX.XX to the host's NetBIOS name table.

2) Add IP.FF.FF.FF.FF to the host's NetBIOS group name table.

3) Submit a receive datagram request for the reception of NetBIOS datagrams destined for IP.XX.XX.XX.XX.

4) Submit a receive datagram request for the reception of NetBIOS datagrams destined for IP.FF.FF.FF.FF.

When a NetBIOS datagram to either address is received, it is processed by the protocol stack and another receive datagram request is submitted.

When an IP datagram is sent, it is considered to be NetBIOS datagram data and sent by a send datagram request to either IP.XX.XX.XX.XX or IP.FF.FF.FF.FF.

Optionally, the IP software may desire to make adapter status queries of the NetBIOS network. As support for SNMP becomes a requirement for IP hosts, these adapter status queries may become mandatory.

Finally, when the IP support for a given NetBIOS host is discontinued, a cancel command request should be submitted for every pending receive datagram, and a delete name request should be submitted for both the IP.XX.XX.XX.XX and IP.FF.FF.FF.FF address added during initialization.

Acknowledgements

This document would not have been possible without the efforts of John Bartas, James Davidson, and Dan Ladermann in the early design and implementation of IP over NetBIOS.

References

[1] Postel, J., "Internet Protocol", RFC-791, September 1981.

[2] IBM PC Network Technical Reference, Document Number 6322916, September 1984.

[3] Mogul, J., and J. Postel, "Internet Standard Subnetting Procedure", RFC-950, August 1985.

[4] Postel, J., and J. Reynolds, "A Standard for the Transmission of IP datagrams over IEEE 802 Networks", RFC-1042, February 1988.

[5] Plummer, D., "An Ethernet Address Resolution Protocol", RFC-826, November 1982.

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